

## DEVELOPMENT UNDERWAY FOR SUCCESSOR TO OMNI

Now that we're all familiar with the tremendous potential that MARKLINK (SM) Service offers to transaction - oriented business applications, wouldn't it make sense to offer standard application products based on these new capabilities? That's what CA's Western Region is doing for Hotel Management, and, not surprisingly, that's what's in the works for Order Service as well. Where the current OMNI offering finds its strength in the software generation process and the solid functional base of Order Service capabilities, the new MARKLINK Service offers sophistication in the operational ease and responsiveness in actually using an

application. So the combination of OMNI and MARKLINK Service is really a natural, and should mean that GEISCO will be able to develop and install Order Service applications that are easier to use, more responsive to time critical information requirements, and less costly to operate. The initial release of this new product (as yet unnamed - any suggestions?) is scheduled for March, 1979. Already some of the CA personnel on "the inside track" are beginning to gear their proposals to take advantage of the upcoming product.

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### BILL OF MATERIALS SYSTEM SOLVES GE-DAD PROBLEMS

GE Distribution Assemblies Department manufactures power distribution equipment. Each order is for a custom built set of equipment from standard parts. As a result, a different Bill of Materials must be produced for each order. Currently the Bill of Materials is manually produced by an engineer. This is a long, high cost operation.

The system currently being installed by CA will allow information to be entered directly from engineering drawings and, with some modifications, will produce the necessary Bill of Materials for the shop. The customer has estimated this will save them the cost of several engineers.

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The project has been unique for several reasons. The project originated in February, 1978 in Connecticut at GE-DAD headquarters through the sales efforts of Sanyu Barnicoat, Account Representative in Hartford. It is being installed in North Carolina and, as a result, has been given day-to-day support by Joe Paccione, Sr. Technical Representative in Charlotte, North Carolina. Joe also wrote an interim DMS system to give the customer something quick to work with while the final system is being developed. Egan Skinner, Sr. Account Representative in Charlotte also aided in the sale by helping with coordination of activities in North Carolina.



*Daisy Dong, Project Manager, is credited with success of GE-DAD project.*

The success of the whole project, however, has been due primarily to the Project Manager, Daisy Dong. During the entire sales and specification cycle, Daisy flew back and forth between Connecticut and North Carolina to build credibility and confidence that we would do the best job. Susan Schultz, Applications Specialist from CA/Boston has been added to the implementation team and is following the same pattern of building credibility and confidence. The customer has stated many times that Daisy's understanding of the problem and her efforts were among the main reasons for choosing us over mini competition at this time.

As a result of the cooperative, united effort to solve the customer's problems and meet his needs by the Carolina and Connecticut sales people and Custom Applications, we were able to land a \$56,400 PSA contract for a system that will generate approximately \$8,000-10,000 monthly processing revenue when it is completed in March, 1979. In addition, it may lead to similar systems in seven other product departments.

## AND OUT OF THE PAST

FIVE YEARS AGO...

- Jim Castle named General Manager of the Sales Department.
- Australia added to MARK III Service network.
- Dr. Ivar Giaever, a physicist at the GE Research Center, awarded the Nobel Prize--only the second person in GE's history.
- Headquarters people got a sneak preview of the new Maryland Center in Rockville.
- Background CRU's were replaced by the National Billing Unit (N.B.U.= \$250).

## THE ROUNDTABLE

I would like to take this opportunity to congratulate each of you in Custom Applications and to thank the many people in Sales for making 1978 our best year ever. Also, I would like to express our appreciation to all of you in Engineering and other components within the Company who have given us invaluable support throughout the year. The dedication and teamwork of all involved resulted in our exceeding all 1978 expectations.

Of all our numerous accomplishments in 1978, which were the direct result of your dedication and hard work, I am particularly proud of the following:

- The strengthening of relationships and teamwork between Custom Applications and Sales.
- Revenue growth of 46%V in both personnel services and computer development billing which together exceeded \$6M and \$28M in 1978 processing revenue resulting from CA installed applications.
- CA's outstanding success this year in developing and implementing systems within original estimates and to customers' complete satisfaction.

- Addition and training of an excellent group of personnel resulting in a 31% overall employment increase.

These, along with many other accomplishments have not only resulted in 1978 being our best year ever but also has positioned us for an even better year in 1979.

Speaking of 1979, we need to continue strengthening our relationships and the teamwork concept with Sales and other components of the Company. We expect to continue revenue and employment growth at an equal or even greater rate than in 1978. Our ability to continue to implement high quality software which meets customer's needs on schedule and within cost estimates is extremely important to our future success. Also, we intend to place greater emphasis on training and individual recognition for outstanding performance in 1979. In fact, a task force has been assembled to review, make recommendations and establish clearly defined equitable rules/measurements for CA's participation in STRETCHBUCKS and MARKMAKERS.

Again, congratulations for an outstanding 1978 and best wishes for a successful 1979 in both your personal and professional activities.

Ned Heinbach

### TEN YEARS AGO...

- "IN" words were:
    - MARK I--the GE-265 Time-Sharing Service
    - IPS--a facility where computers are located
    - BASIC--former XBASIC compiler
    - ABASIC--former BASIC compiler
- And when you answer the phone, begin by saying, "General Electric Time-Sharing Service".

- Bob Caton and Gene Vennesland graduated from CAS class.
- Ed Isaacs headed ISD'S successful blood bank program in Bethesda.
- President Fred J. Borch announced that General Electric sales reached a new high of 8.4 billion in 1968.
- GE announced Medinet Service.

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## EIGHT GRADUATE FROM FINAL CA NETS

The last CA New Employees Training Seminar ended December 8 after four weeks of technical, orientation, communications and sales courses held in two sessions, October 23-November 3 and November 27-December 8 in Rockville. The next group attending NETS from CA will be joining Sales employees for six weeks of classwork; of course, the group will split-up for some classes to give greater sales or technical emphasis.

You don't have to necessarily be a "new" employee to attend NETS. Just ask Phil Snyder who 6 1/2 years after joining General Electric and working in the Supercenter Operations section found himself in NETS. Phil felt like a new employee because he says, "The CA/Sales environment is that different."

Phil reports he discovered many interesting tidbits in NETS. "FORTRAN, for one, has changed a great deal in the past 6 years. The IF-THEN-ELSE-ENDIF construction sure is handy and not having to count out the Hollerith characters for printing literals saves lots of time and aggravation."

Everyone seemed to enjoy the Professional Selling Skills course taught by Ike Smith. Phil liked the



*Standing from left to right: Rick Stever, Allan Peltz and Paul Hodgdon.  
Sitting from left to right: Stephen Klaber, Pam Kaur and Phil Snyder.  
Not pictured: Jim LaPointe and Ron Watkins*

PSS idea that one sells to satisfy the needs of the customer and was amazed at how quickly the class seemed to pick up skills.

The only aspect that Phil did not like about the last CA NETS was that it was all over so soon.

*"Past" Continued from Page 3*

- "Our information systems business.... ended the year with good progress according to plan. Revenues were well above those of 1967. The company maintained its leadership in the fast-growing area of time-sharing in both its world capacity and volume of service."
- GE President Fred J. Borch announced "...for our world wide information systems, 1968 was another year of substantial improvement, even while we were continuing a sizeable expansion of our operating base in this major new area of opportunity."

# PEOPLE



Computer people have some weird backgrounds but how about an ex-peanut butter maker turned CA consultant. Stu Sather's first job after earning a chemical engineering degree from the University of Minnesota was running a peanut butter pilot plant for Procter and Gamble in Cincinnati. Stu says he decided to go into DP the day the pipes burst.

Since then, Stu has been a timesharing manager and departmental controller for Xerox in Rochester, N. Y., and has picked up an MBA in finance from Rochester Institute of Technology. He joined ISBD

in 1975 as a senior tech rep in Rochester, and moved to Rockville as a CA consultant for financial systems in 1977.

Stu's assignments in the past year have taken him to Europe three times, and all over the U.S., helping sell and design CA financial consolidation and accounting systems. Off the job, he's a duplicate bridge life master, and played in the international bridge championships in Toronto last summer.

Stu is always available to the field for financial services consultation.

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## CA ADMINISTRATORS SEMINAR HELD IN ROCKVILLE

The second Custom Applications Administrators Seminar was attended December 12 and 13 in Rockville by 15 administrator/secretaries. Nine attendees were participating for the first time in the two day program of presentations and workshop. A portion of the previous agenda was unchanged for the benefit of new employees, but most topics were approached differently and three new ones added.

The group got the opportunity to ask questions first hand of Bill Aboud about Relations paperwork/procedures; Norm Otis about OLOS; Jim Porter about Word Processing availability for CA documentation; Cheryl Frankeberger about Edit Runoff; Genie Reilly explaining the ROP process; and Jim Morgan discussing physical and data security and administrator's role in security audits.



*Standing from left to right: Adrienne Byer, Linda Ward, Judy Malinak, Pat Sluder, Jeanette Martin, Carol Shofner, Sharon Carroll, Roseann Alesandro, Connie Horton, Sally Friedmann.  
Sitting from left to right: Norma Blaauboer, Dorothy Morrison, Ericka McCormick, Linda Wesley, Winifred Elam.*

*"Seminar" Continued on Page 12*

The program development effort is currently underway within Application Systems in Rockville. Joe Schmid, Manager, Application Languages and Generator Development, is responsible for the OMNI/MARKLINK Service integration and has the able crew of Henry Martin, Jerry Lechliter, Ricky Rollins, and Laurie Jo McPherson applied to the challenging task. (In conjunction with this effort, another area within Application Systems is currently developing a much-needed MARKLINK Service based Accounts Receivables module in Foreground designed specifically to support the new Order Service offering).

But before any programming could get started, on the Order Service offering, a lot of questions had to be answered - questions concerning the most effective use of the new MARKLINK Service capabilities. What kinds of data should be stored locally vs. on the host? Where should (and could) the various processing logic be performed? How could the MARKLINK <sup>TM</sup> Terminal be used to reduce the cost of output reporting? Finding the optimum mix of distributed and centralized computing was no easy task, but then Kent Schwab is no Barney Oldsalt. Known best from the backside (demonstrating MARKLINK Service capabilities at the Regional Meetings) Kent, a Sr. Product Specialist in Business Data Services, International Marketing, also has considerable talents in Order Service requirements analysis and the detailed operation of the MARKLINK Terminal. Through his in-depth evaluations, combined with the experiences of the CA-Dallas Order Service personnel and the Application Systems experts on the Order Service program development team, the details of the integration of OMNI and MARKLINK Service were hammered out. In effect, the direction taken will provide for both a straightforward development effort and a very modular end-product, with many sophisticated techniques accounting for this result. The Phase I product due in March will essentially carve out the existing dumb terminal data entry procedures and replace it with

MARKLINK Service operations and will offer interactive stock allocation routines as well. Phase II, still on the drawing boards but anticipated by year-end, will call for the complete re-write of the batch updating logic into (real-time) transaction processing routines. Phase II will also likely re-structure the program generation capabilities to allow the product to be more versatile, so it can be applied to an even wider range of application types, from the very simplistic to the very sophisticated.

The resulting Order Service offering will provide significant added user benefits: line oriented, comma separated data entry will be replaced by intelligent form-fill operations; the order entry process will include up-to-the-minute credit checking and confirmation of delivery schedules; status inquiries will always display



*Kent Schwab, Sr. Product Specialist  
in Business Data Services*

up-to-date information; rush shipments are easily handled through immediate operational report printing; remote locations can be accessed efficiently; and finally, total operating costs should decrease by an estimated 20-40%.

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*Dana Lowry, Mgr.  
Business Data  
Services*

Making the best of this very significant market opportunity is the responsibility of Dana Lowry, Manager, Business Data Services. Dana, no stranger to Order Service himself, has a very experienced program team assembled which includes - Tom Jared and Sara Rubida in addition to Kent. Their job is to define the market segments, position the product accordingly, and provide the proper tools and procedures to sell, install, and support all types of Order Service applications. They've got lots of activities underway to accomplish this, many of which should be introduced in the second quarter of this year. They're also very interested in hearing your ideas, so if you've got either questions or suggestions, don't hesitate to give them a call.

## WHAT'S HAPPENING

In the ~~Division~~... OOPS! Company...

- General Electric Information Services Company becomes operational January 1, 1979.
- MARKMAKERS romp in Puerto Rican sun February 1-4.
- First IBM 3033 up and running for MVS QA testing.
- New Jersey Bell Telephone Company signs Master Ordering Agreement.

In CA...

- CA headcount reaches all time high of 195 by January 1979.

- Denver CA office is opened December 1978 and staffed by Dave Votta, Manager and John Boehlke, Project Manager.
- Barbara Harbison, Philadelphia Office Manager, goes west to become Manager of CA/San Francisco.
- New York office splits to form new ADO (Applications Development Office) headed by Eileen Ripley.
- Dave Aaronson becomes Los Angeles Office Manager.
- Major new PSA contracts include Hartford National Bank for Teller Management System, GE Distribution Assemblies Dept. for Price/Cost System and New Jersey Bell for Service Order Control System.

# TECHNICAL MAILBOX

## MARKLINK<sup>(SM)</sup> SERVICE PROTOCOL AND X.25

*This article attempts to explain, in a non-technical language, the differences and similarities between MARKLINK Service Protocol and X.25 Protocol. It is not intended to be a comprehensive description of either. (X.25 Protocol is the internationally approved standard for transmission of data over networks. The X.25 is an arbitrary designation and is not significant of any communications capability.)*

The new MARKLINK Service Protocol is the high-speed data communication link between the MARKLINK Terminal(s) and GEISCO's Network, that is, an MRC (and from there through the network to the MARKLINK host). It is based on packet switching technology (formatting of user data into discrete data streams or packets) and using leased or dial-up synchronous circuits allows multiple programs in one or more terminals to communicate with one or more programs running in one or more host computers over one physical line.

This protocol is very similar to the X.25 Protocol, approved by CCITT (International Telephone and Telegraph Consultative Committee) at its Geneva meeting in March, 1976. X.25 is expected to be adopted by the PT&T's of the European economic community and Canada and Japan as the standard data communication interface protocol in these countries. To look at the differences between the two protocols let's very briefly describe the three levels of interfaces underlying the protocols:

1. The physical interface level defines the physical, electrical and functional characteristics of the actual physical connection or circuit over which data is to move.

It describes the synchronous mode of bit patterns movement (that is, without the intervening start/stop bits used in asynchronous mode) at high speeds e.g. 2400, 4800 and 9600 bps. Both protocols use the RS-232-C Standard as defined by the Electronics Industries Association (EIA) in the US and adopted internationally by CCITT.

2. The frame level logical interface defines the procedures or set of rules or conventions for establishing a logical link or data access connection between terminals and computers for the accurate exchange of data and control information. There are different sets of rules set up for the following "physical" circuits:
  - a. Private or leased line between one terminal and one computer. This is also known as a dedicated point-to-point circuit. This could be either full or half duplex.
  - b. Dial-up line between one terminal and one computer. Also known as dial-up "point-to-point" circuit.
  - c. Private or leased line between one computer and two or more terminals; also called dedicated "multi-point" circuit. Note that there cannot be a dial-up multi-point circuit.

X.25 Protocol Frame Level Interface, currently, supports only the dedicated full duplex, point-to-point circuit. MARKLINK Service Protocol, on the other hand, will support all three; the first two have already been implemented. This is the only





difference between the two protocols. For more details consult the High-Level Data Link Control Procedures (HDLC) specified by the International Organization of Standards (ISO). The frame level interfaces of both protocols are fully compatible with HDLC.

3. The Packet Level Logical Interface describes how the user data sending/receiving station address information is to be structured for transmission. Data moves from one station to another in what are known as frames. Each frame contains a packet of user data and address information surrounded by control and error checking information as well as frame delimiters - based on the set of rules for the kind of circuit as referred under Frame Level Interface above. The packet level interface rules ensure proper handling of data, that is, the splitting of a long data stream into standard packets, then numbering and sequencing them so that the receiving station can verify receiving it correctly. Packet level interface also facilitates inter-leaving data frames from/to multiple programs in multiple terminals and computers. Both protocols handle packet level interface in exactly the same manner.

or dedicated multi-point circuits may provide them with the right amount of communications capacity and much more economically than dedicated point-to-point circuits.

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#### BUZZ WORDS

- NIP - Network Interface Processor--front-end processor which interfaces MARK III Background VS Service's host and a CC.
- SPAD - Scratch PAD--device which allows multiple file systems/processors in a cluster.
- PSA - Personnel Services Agreement--contract for (CA) personnel services between GEISCO and customer.
- IT - Intelligent Terminal
- PIC - Program for Individual Careers--posting/notification of job openings.
- RFM - Remote Facilities Management--management of all or part of a user's data processing functions under a long term contract using remotely located computers and peripherals.
- ATQ - Authority To Quote--document for special customer pricing and contract terms.
- LTID - Logical Terminal Identification--identifier required in high-speed service.

In conclusion, it may be mentioned that although currently MARKLINK Service Protocol is not fully compatible with X.25 there are obvious business reasons for this incompatibility. Many of our potential MARKLINK Service customers would find that dial-up point-to-point

# FILE CONTENTION

## PART II

In the previous issue, file contention and locking procedures for F77 files was discussed. While all of the stated rules work for single file databases, they do not always operate the same for database structures, notably HISAM, which consists of more than one file.

Basically, a HISAM database consists of a single control or logical file and one or more data or physical files. As a design consideration of HISAM, it was decided that a user may not lock the complete database, but just a single physical file at one time. Because of this feature, the user must give up some file locking control to the HISAM routines.

Due to the nature and usage of HISAM, the user usually does not know, and really should not care, which physical file any particular record resides on, as access to a specific physical file is not normally done under direct program control. Just as in all HISAM calls, the user references the database by logical file indicator in the LOCK statement. Since the ultimate intent of the LOCK is to lock a specific physical file, and not the logical file, the actual lock can not take place until a physical file is accessed by one of the HISAM action routines: HSET, HGET, HNEXT, HNWP, HNWPL, HREPL, HISRT, HPUSH, and HDELE.

When a HISAM database is opened, only the logical file is actually opened. The first HISAM call to the database causes the logical file to be read into the database control buffer space, the HISAM type indicator is turned on, and the logical file is closed. Note, if no HISAM routine is called between the time the logical file is opened and the LOCK is called, the logical file will be locked. The first subsequent call to a HISAM routine will read the file, turn

on the HISAM indicator, and close it. Therefore, to avoid unintentional locking of the logical file, it is always wise to call at least one HISAM routine before locking, even if it is of no apparent use to the program.

When a user specifies a logical file indicator in a LOCK, and the HISAM type indicator is on for that database, another flag is set to indicate that the physical file the next HISAM action routine accesses is to be locked. Unless the database was not opened with write access the alternate return of the LOCK should not be taken. When the physical file is accessed by a HISAM action routine, and the lock flag is on, an attempt to lock that physical file is made. If the physical file is currently locked, the second alternate return is taken from the HISAM action call unless a user supplied waiting routine is utilized.

A user supplied waiting routine is used to indicate to HISAM that an automatic retry of the HISAM action call is to take place because the physical file to be accessed was locked. The HISAM manual explains how to set this routine up and an example is provided. The example, however, is keyed upon user intervention to continue the lock attempts, or to abandon the try. Most production systems could not use this as the users are not familiar enough with the problem to knowledgeably act upon this situation properly. Therefore, an automatic function must be provided to attempt a specified amount of retries before failing. Each retry should be proceeded by a swap out, for reasons stated in the previous article. By listing the file .LOCKER in the DY28 catalog, an updated version of the LOCKER routines, and an automatic retry routine, which compliment each other, may be obtained.

One must be careful when executing more than one HISAM routine when a physical file is locked. When the second call refers to a different physical file, the current physical file is unlocked and closed, the second is opened and a lock is attempted. Thus it is possible to update a record in one physical file, and get a file busy error when attempting

an action on another physical file, even if the subsequent action is a read such as a HGET or HNEXT.

Finally, to remain consistent, HISAM does not attempt to treat a database with a single physical file any differently than one with multiple physical files.

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## USER NUMBER PASSWORD SELECTION AND PROTECTION

The MARK III<sup>®</sup> Service user number password is the first level of access control to program and data files. In order to help protect these contents from modification, destruction or disclosure by unauthorized personnel, a password should be known only by those individuals needing it to perform their jobs, and it should be carefully selected and protected.

### SELECTION

First, a password should be difficult to guess, e.g. not personal or company oriented in nature. Security strongly recommends the use of random pronounceable passwords, e.g. BLEKDRIN or PHIELGUD. These provide a good balance between being easy to remember (so the user won't be tempted to write it down somewhere) and difficult to guess. User number passwords may be constructed from the following characters:

Alphabetic A - Z

Numeric 0 - 9

\*

.

\$

Non-printing ASCII octal 034,  
035, 036, 037

(CONTROL/SHIFT K, M, N, and O)

Second, a password should be eight characters in length. This provides a higher degree of protection against exhaustive enumeration ("cut and try") than a short password.

### PROTECTION

To protect the password from being observed by passersby (or found exposed in the trash) the underprint or print inhibit options should always be utilized during log-on at a hardcopy terminal. CRT users should immediately enter a clear-screen character after entering the password. High speed users should destroy paper containing the log-on password.

Customers with whom you come in contact should be encouraged to carefully select and protect their user number passwords. However, this same care should be applied to internal user numbers as well. Note that internal usage is being kept to the necessary minimum; failure to adequately protect internal user number passwords may lead to their use by unauthorized personnel, with consequent depletion of time and storage resources within your internal use budget.

*"Seminar" Continued from Page 5*

Will Gilly, Christine Morgan, Ron Smith and Larry Snively gave presentations on CA-related subjects.

The consensus felt the seminar was successful by providing a worthwhile refresher and an opportunity to quickly become familiar with new processes, not to mention the rewards of interaction.

The seminar was organized and coordinated by Pat Sluder.

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# INTERFACE

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## PROJECT TEAM RECEIVES MANAGEMENT AWARDS

The project team that sold and implemented the SMART System for GE-NEBG received special recognition by management for their outstanding contribution to NEBG.

The system was needed to handle integrated order entry, inventory control and material requirements planning. Even though specifications had not been prepared for this very complex system, the system was needed to go into production in four months.

As soon as the contract was approved, an informal team was formed with eight part-time people in almost as many locations. Darline Remy was assigned as Project Manager. Darline and Gretchen Gregory then began the task of defining the system.

As expected, changes and enhancements were enlarging the system far past the original definition, but the spec was completed in record time with coding starting as soon as an overall design concept was formulated and as each module was defined. Each individual on the project spent many long hours and weekends to meet the schedule and ultimately satisfy the customer's needs. Halfway through the implementation, Darline transferred to Houston and Gretchen took over as Project Manager to complete the system.

NEBG has contracted for additional services since the successful completion of the SMART System.



*Back left to right: Bob Pietzke, Dick Henderson, Dave Aaronson, Marty Reese and Matt Herman*

*Front left to right: Matthew Leek, Gretchen Gregory and Lun Kwan*

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## CA OPENS DENVER OFFICE

The newly opened CA/Denver office is now in full operation. The staff consists of: John Boelhke, Project Manager; Judy Ruzicka, Sr. Applications Specialist; Susan Sinkovich and Ed Nockunas, Application Specialists, and Dave Votta, Manager.

Established to provide the necessary CA resources to capitalize on the lucrative Mountain States District's diverse marketplace, the group is totally immersed in a variety of system applications ranging from Order Service to Mine Planning; General Accounting to Oil Well Drilling Analysis.

The geographic territory supported by CA/Denver makes up about 25% of the U.S. Fortunately, most of the business centers around Denver and Phoenix but occasionally, customer requirements take them to cities as far away as Casper, Wyoming and Butte, Montana.

As one can imagine, starting a new office has its typical administrative headaches. The sales offices are lending space while permanent facilities are being made ready. Desk shuffling and terminal sharing are commonplace. The sales office personnel have gone out of their way to be accommodating and assisting in any way they can, and a tremendous help to Dave Votta and staff.

From a personal standpoint, Dave Votta says, "I've been so busy that I haven't had much of a chance to miss the "Rock". The biggest change I've noticed is the time "lag". I still haven't become totally adjusted to a two hour time difference and still continue to operate on Eastern Time. (Once an Easterner always an Easterner).

However, day to day business is another story. The U.S. mail and telephone leave a lot to be desired compared to personal contact. Walking a stairwell or driving to Shady Grove to get an immediate solution to a problem is a

convenience I sorely miss. Telecopiers break down, the mail gets lost, and the phones are always busy. So goes the life of a field employee."

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## MARKLINK<sup>SM</sup> SERVICE DEMONSTRATION GUIDE

The guide for the MARKLINK Service Demonstration is now available. A copy of this manual, describing the purpose and operation of each module of the demo will automatically be forwarded to each holder of the MARKLINK System Selling Guide, to each CA Region, and to each Market File Librarian. Additional copies will be stocked on OLOS, publication number 1300.22. Any comments on ways of improving the guide or the demonstration may be forwarded to Kent Schwab on 8\*273-4334 or Dana Lowry on 8\*273-4463.

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## RESULTS OF THIRD PARTY AUDIT

Congratulations on doing an excellent job of protecting customer data and passwords during the recent audit performed by Peat, Marwick, Mitchell & Company. The auditors noted a significant increase in security awareness and the overall security attitude of the field force. Because of this fine effort on your part, the new Third Party letter available to auditors of our customers for 1979 will contain no serious security deficiencies. A clean Third Party letter will reaffirm to our customers and their auditors GEISCO's commitment to maintain the highest standards with respect to the protection of customer data stored on our computers.

# LOOKING FOR LEVERAGE?

## Look at DMS II Application Prototypes!

Recently Marketing and Engineering have released several application systems into the MARK III<sup>®</sup> Service Library, and all CA field offices have received the accompanying documentation... JOB SHOP RAW MATERIAL INVENTORY CONTROL (5610.34), MACHINE DOWN TIME REPORTING (5610.35), and CAPITAL BUDGET CONTROL (5610.37). These systems, called application prototypes, may prove useful to CA developers working on projects in certain business areas. Application prototypes may reduce the time and effort required to get a customer's job up and running, in effect improving the overall leverage on a project.

The term, application prototype, is intended to convey two ideas: 1) That a given customer "application" area is addressed by the system, and 2) That the software is a "prototype", useful in itself, but also a model for future developments. Each prototype is documented in an Application Guide which demonstrates how a DMS II system is built and how it can be used. Many examples show how ad-hoc reports augment a HISAM-based system, speeding up implementation. Each prototype has been chosen from a marketplace environment, and represents an example of a DMS II solution for a customer problem. All source language programs and files comprising the system can be obtained from the MARK III Service Library without any special permission or fees.

Several CA people who have taken a close look at the early application prototypes have suggested they could be incorporated directly into a customer system being developed under contract. Since the prototypes are constructed principally with DMS II, they are fully compatible with other MARK III Foreground Service software such as FAL, STATSYSTEM, PLOT, etc. But even if they can't be used

"as is", many times the prototype can be modified to meet unique customer requirements. Also prototypes can serve as an aid in communicating with the customer. It's often easier to understand, discuss, and build upon a specific example, than it is to talk about a general computer capability such as DMS II. One other use for the prototypes is that people new to CA can use the Application Guides as tutorial material to gain some understanding of applications that may not be familiar. Each Application Guide contains instructions for demonstrating the prototype, so actual "hands-on" experience is possible.

Producing the prototypes is a joint effort of Marketing and Engineering. Joan Warner in Marketing selects the prototypes from functional business areas that are receiving special marketing emphasis.

*"LEVERAGE" continued on Page 6*



*From left to right: Joan Warner, Lyn Burke, Elena Sacchet, Wayne Hagood and Larry Jenkins*

# GENERAL UTILITY FOR MARKLINK<sup>SM</sup> SERVICE

The MARKLINK Service utility LAYOUT was developed by Rickey Rollins of Applications Systems. Layout was originally developed by Rickey as a tool to aid in the generation of MARKLINK Service based Order Service Systems and has been used as the vehicle for customizing the MARKLINK Service demonstration. As many of you who have used LAYOUT can attest, it is a very valuable general utility to help develop MARKLINK System screen formats. It can:

1. "Draw" new screens and catalog them in its indexed file.
2. Modify existing forms in its catalog.
3. Delete forms no longer desired.
4. Generate TPL source subroutines necessary to produce one or all of the cataloged forms.

LAYOUT is menu-driven, as you can see in the main menu screen below. If you do not have a copy of LAYOUT, or your version is not the one shown here (V1.0) then down-line load a copy of LAYOUT



*Rickey Rollins, Programming Specialist in Applications Systems*

stored in the IPO22 catalog and use the MARKLINK System utility RB to put it back into /PGM form. If you have any questions regarding down loading the software, just give Kent Schwab a call at 8\*273-4334. A users' guide is now in production for LAYOUT, but the utility's use is really self-explanatory.

```

*****
*
*                               LAYOUT TEMPLATE GENERATOR                               V1.0
*
*****
*  FORMS BUILDING COMMANDS          *  LAYOUT FUNCTIONS
*****
*
*  COMMAND DESCRIPTION              *  CODE DESCRIPTION
*  ***** *****                  *  **** *****
*      H  HORIZONTAL LINE           *      aa  SELECT FORM -- NAME = aaSCRn *
*      V  VERTICAL LINE             *              aa = ANY TWO ALPHA CHARATERS*
*      T  TEXT                       *              n = PAGE NUMBER
*      C  CLEAR ROW OR COLUMN        *      *X ASK FOR 6-CHAR NAME
*      U  UPDATE (SAVE) FORM         *      *L LIST NAMES OF ALL FORMS
*      D  DELETE FORM                *      *G GENERATE TPL DISPLAY ROUTINES
*      E  TERMINATE (NO UPDATE)      *      *T TERMINATE LAYOUT
*      F  POINT TO LOCATION          *
*****
*  ENTER FUNCTION CODE --          *  NAME
*                               *  OK (Y/N)
*****

```



## NEW POCKET CARD RELEASED

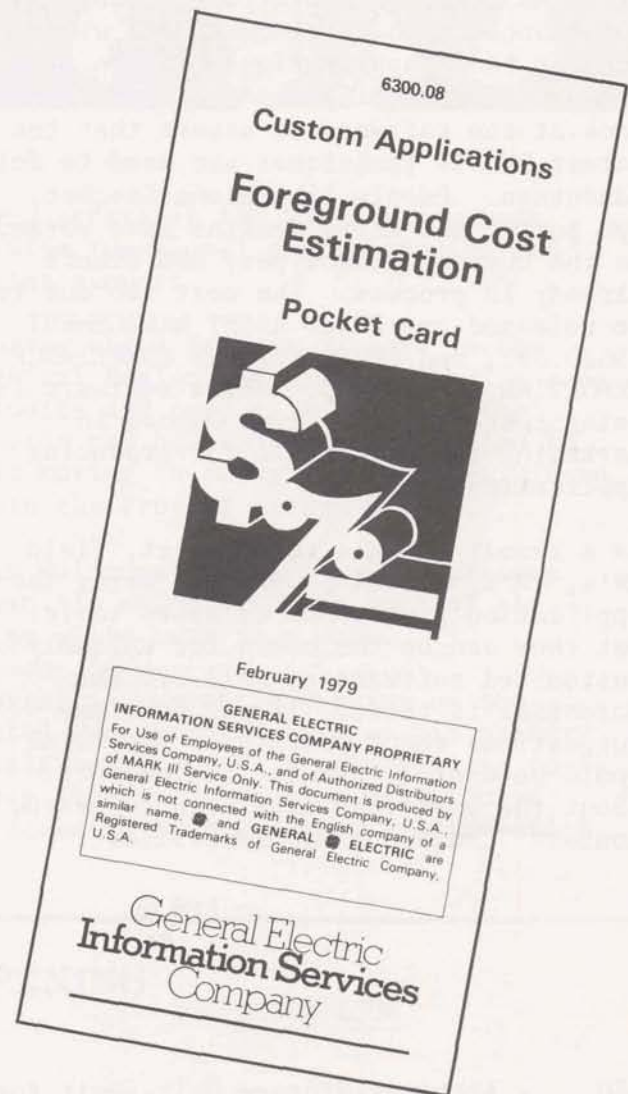
Are you tired of thumbing through the 197 pages of the CA Cost Estimation Handbook to locate the cost tables you need to generate your Foreground cost estimates? Wouldn't it be nice if the ten pages of SORT\*\*\* tables in the Handbook were reduced to two simple and concise tables that took no more than one page? Does it confuse you that you must use .8 as your base core factor in FOCAS when you're estimating FIV jobs?

If you've answered yes to any or all of these questions you'll be pleased to know that the new CA Foreground Cost Estimation Pocket Card has been released. This new Card is designed to readily provide Sales TR's and CA personnel information that is most often needed in a more convenient form. Let's take a look at the benefits that you'll gain by using the new Pocket Card.

The new Cost Estimation Card is compact and easy to use. It has practically everything that you'll need to develop your Foreground cost estimates.

The Card contains the most frequently used tables from the Cost Estimation Handbook, including the HISAM, binary and ASCII file access tables, and also the SORT\*\*\* tables. All the tables have been upgraded using F77 benchmarks and the table layouts have been re-designed for easy use.

The Card also contains user instructions for the new FOCAS program. The new FOCAS allows you to select either FIV or F77. The pricing options have been expanded to include the Federal Government and the General Electric pricing plans. The Fact file input fields have been improved for easy use. Many of the REAL fields have been changed to INTEGER. Core size is used rather than a core factor (i.e., the new FOCAS will compute the core factor).



The Cost Estimation Card can also be used to assist you during your site surveys. It contains an "Application Considerations Checklist" that can be used to help gather the information you'll need to develop your cost estimates.

I think you'll agree there are many advantages to using the new Cost Estimation Pocket Card. To get your own copy, use the On-Line Ordering System (OLOS) and order publication #6300.08. If you have any questions or suggestions call Ron Smith on 4284 at CA Headquarters.

Field AR's and TR's provide valuable assistance in locating customers willing to have their applications used in this manner. Engineering then takes a close look at the software to assure that the latest DMS II techniques are used to full advantage. People like Elena Sacchet, Lyn Burke, and Larry Jenkins have worked on the current prototypes, and others already in process. The next two due to be released are FIXED ASSET MANAGEMENT (5610.39), and PERSONNEL AND COMPLIANCE REPORTING (5610.29A). While software is being tested by QA, Wayne Hagood in Marketing is responsible for producing Application Guides.

As a result of this team effort, field AR's, TR's, and CA people are using the application prototypes as sales tools. But they can be the basis for uniquely customized software as well ... the potential is there. If you have any suggestions about prototypes you think would be useful to have, or comments about the ones that have been released, contact Joan Warner in Rockville.

---

#### BUZZ WORDS

- ASU - Archival Storage Unit--unit for measuring off-line storage.
- BASIC - Beginner's All-Purpose Symbolic Instruction Code--programming language.
- BMC - Bulk Media Conversion--process of converting data from card to disk, disk to tape, etc.
- CDR - Computer Development Revue--computer service charges during systems development.
- CRU - Computer Resource Unit--measure of processor usage.
- RNA - Ring No Answer--condition in which the network does not acknowledge a user dial-up.

#### CORRECTIONS

##### Issue 1 - File Contention

A CALL BREAK(0) will not cause a swap-out when the break key is already disabled, contrary to what the article stated. The same holds true when a CALL BREAK(1) is used and the break key is enabled. However, a swap will take place when the break status is changed, that is, from enabled to disabled, or disabled to enabled.

A better technique is to use CALL SLEEP(0) which will cause a swap each time it is called, and will result in the program being placed immediately back in the processing queue. Since this has no effect in the break key status, the user must make provisions to disable the break key before any sensitive updates are made. The .LOCKER routine has been updated to reflect this new technique, and currently resides in the DY28 catalog.

##### Issue 2 - User Number Password Selection and Protection

A typographical error resulted in an incorrect description of one of the choices for non-printing ASCII password characters. The correct list is the following:

ASCII octal 034, 035, 036, 037  
(CONTROL/SHIFT L, M, N, and O, respectively).

# PEOPLE



Murray Waldron began his career with General Electric in 1955 with our Motor Department in Somersworth, N.H. Following several years of varied work experience, Murray decided to add to his Business Administration degree by returning to Babson College for an MBA in Production Management.

Prior to returning to General Electric in July of 1973, Murray was employed by McDonnell-Douglas Automation Company as a Management Consultant. This work provided him with extensive experience and a broad knowledge of organization, planning control and systems in a wide spectrum of business enterprises.

Presently serving as a Consulting Specialist, Distributed Systems, he has

been active in the Hotel Management System functional design studies and sales support.

Murray was a Project Manager in the Central Region and participated in many studies and proposals for both the region and headquarters. This led to his moving to Rockville in late 1978 to join the Project Review office.

The Waldrons' raise English Springer Spaniels which occupies much of his time while away from work.

Murray is currently working on the Hotel Management System as his primary assignment, but is always willing to help the field as other distributed processing systems opportunities arise.

## WHAT'S HAPPENING

In CA...

- Ed Scott transferred from GE-RESO to become new Manager of CA/Philadelphia.
- Welcome to the following new employees to join CA since January 1, 1979:

### Eastern

Patricia Love  
Alan Markowitz  
Theresa Reed  
David Grischuk  
Mary Farley

### Northern

John Logan  
William James  
William Cassedy

### Order Service

James Jones  
Don Ina

### Project Review

Aravia Holloman  
Louise Lougen  
Rita Crawford

### Southern

Alan Grus  
Larry Singleton  
Thomas Davis  
Richard Johnson

### Western

Pat Rakich  
Judith Ruzicka  
Richard Eshun  
Dalyn Soo Hoo  
Edward Nockunas

# TECHNICAL MAILBOX

## F77OUTB - A DIFFERENT OUTPUT EDITOR

F77OUTB is an output composition routine which offers the user more flexibility for constructing very detailed formats compared to any other available routine. Except for the simplest output formats (i.e., no character insertion, no floating or fixed characters), F77OUTB performs 15-40% better on a CRU basis than any other system I/O routine tested. Additionally 2000 words of memory are saved when F77OUTB is used in conjunction with an input parsing routine, eliminating the need for INPUT, PRINT AND FORMATTED READS AND WRITES.

F77OUTB operates on a one line output buffer and converts internal integer to

external form placing it in the next available position in the output buffer. The user can specify character insertion, character fields, character position spacing, scaling and fixed or free field format. In addition, F77OUTB can perform integer date conversion where YYYYMMDD is converted to MM/DD/YY.

For a source listing of F77OUTB, list '.F77OUTB' in the GDY28 catalog. File 'EXOUTB' may be 'listed' and 'run' to get usage and output report samples.

You may call Frank Gargallo or Charlotte Walker at 8\*(404)325-1627 for additional information.

\*\*\*\*\*

### F77OUTB

#### CALLING SEQUENCE

CALL F77OUTB (INI,\$)

INI

(INTEGER): An array of values to convert.

\$

(RETURN): Alternate return for an error condition. CVERR is set to the corresponding error code described below.

#### LABELED COMMON FORMAT

COMMON/OUTCOM/CVERR,USERDEF,OBFF(40),  
SUPVAL,MINSGN,XMN,BEFORE,AFTER,FILLER,  
PERIOD,COMMA,FLOATCH,FLTCH,SUPNO,MINNO,  
BEHIND,BEF,AFT,NCHO,SCALE,INSERT,  
SPACER,NEXTCH,INLOOP,INMODE

#### COMMON DECLARATIONS

LOGICAL USERDEF,FLTCH  
FILENAME SUPVAL,MINSGN,XMN,BEFORE,AFTER  
ALPHA FILLER,PERIOD,COMMA,FLOATCH

#### COMMON PARAMETERS AND USER OPTIONS

CVERR

(INTEGER): When an error condition occurs CVERR is set to an error code and the alternate return taken.  
=1:Field Error - the number of characters in the converted field exceeds the user specified field size. INLOOP is set to the error field number.  
=2:Buffer Error - the number of characters in the converted field exceeds the number of available character positions in the output buffer.  
=3:Mode Error -  
INMODE<1 or INMODE>4



USERDEF  
(LOGICAL): =.TRUE.:user defined  
conversion specified.  
=.FALSE.:not user defined -  
default parameters  
used and option  
specifications  
ignored.

#### DEFAULT SPECIFICATIONS

Free field output.  
No output suppression when  
the value to convert is zero.  
No character insertion.  
No character fields to insert  
before or after the converted  
field.  
Decimal point is represented  
as "."  
Minus sign is represented as  
"-"

OBFF(40)  
(ALPHA): buffer to move converted  
value(s) to

NEXTCH  
(INTEGER): next available character  
position in the output buffer  
OBFF. NEXTCH is updated  
after each conversion to  
reflect the new NEXTCH.

INLOOP  
(INTEGER): indicates the number of times  
to repeat the conversion or  
the number of entries in INI.  
if INLOOP = 0-->1

INMODE  
(INTEGER): indicates the type of  
conversion to perform  
1=integer conversion  
2=scaled conversion where the  
decimal point is placed in  
the SCALE-plus-1 position  
from the right  
3=date conversion where  
YYMMDD is converted to  
MM/DD/YY

4=date conversion where the  
sequential day from KDAY is  
converted to MM/DD/YY

NCHO  
(INTEGER): number of characters allowed  
in the converted field.  
>0: place the converted value in  
a field size of NCHO  
characters.  
=0: Free Field Format. The first  
character of the converted  
field will be in NEXTCH.

FILLER  
(ALPHA): value to Fill Fixed Field  
before conversion begins.  
Filler can be a blank(s) or  
any other printing characters  
such as "\$\$\$\$" or "XXXX".  
NCHO>0: Fill Field of NCHO characters  
with the value contained in  
Filler.

SUPVAL  
(FILENAME): value to place in the output  
buffer if the entry to  
convert is zero, such as  
"\*\*\*\*\*" or "N/A".

SUPNO  
(INTEGER): the number of characters in  
SUPVAL.  
>0: suppress output.  
=0: do not suppress output.

INSERT  
(INTEGER): the number of characters to  
insert between digits in the  
converted value.

COMMA  
(ALPHA): value to insert between  
digits.  
INSERT>0: place INSERT number of  
characters in COMMA between  
every three digits.  
INSERT=0: do not insert a character(s)  
between digits.

Continued on next Page

SCALE  
(INTEGER): the decimal point is placed in the SCALE + 1 position from the right.

PERIOD  
(ALPHA): the value to use as a decimal point.

FLTCH  
(LOGICAL): =.TRUE.:floating character is specified.  
=.FALSE.:no floating character is specified. The option is ignored.

FLOATCH  
(ALPHA): the character to float in front of the converted value, such as "\$".

SPACER  
(INTEGER): the number of character positions to skip between converted values or fields. INLOOP=1:SPACER is ignored. INLOOP>1:skip SPACER number of character positions in the output buffer before converting the next entry. (NEXTCH=NEXTCH+SPACER)

[For INI(SUBS)<0]

MINSNGN  
(FILENAME): the value to insert in front of the converted value.

MINNO  
(INTEGER): the number of characters in MINSNGN.  
<0: float MINSNGN in front of the converted value.  
>0: place MINSNGN in front of the fixed field.  
=0: no value to place in front of the converted value.

XMN  
(FILENAME): the value to insert behind the converted value.

BEHIND  
(INTEGER): the number of characters contained in XMN.  
>0: place BEHIND number of characters in XMN after the converted value.  
=0: ignore specification.

[For INI(SUBS) 0]

BEFORE  
(FILENAME): the value to insert in front of the converted value.

BEF  
(INTEGER): the number of characters in BEFORE.  
<0: float BEFORE in front of the converted value.  
>0: fix BEFORE in front of the fixed field.  
=0: no value to insert - specifications ignored.

AFTER  
(FILENAME): the value to insert behind the converted value.

AFT  
(INTEGER): the number of characters in AFTER.  
>0: place AFT characters in AFTER after the converted value.  
=0: ignore specifications.

\*\*\*NOTE\*\*\*

1. If INI(SUBS) = 0 and SUPNO = 0 BEFORE and AFTER will be used to compose the field.
2. When using BEHIND and AFT for a field that is to appear as a column in a report, pad the shortest of XMN or AFTER with enough blanks to make BEHIND and AFT equal.

\*\*\*END OF NOTE\*\*\*

CAUTION

The user should be sure to initialize the output buffer OBFF to blanks before constructing each new line of output. You may use the F77 System Subroutine CINIT to accomplish this task.

## XIN SUBROUTINE AVAILABLE IN F77

The XIN77 subroutine is available for those of you writing command-driven systems or driver-type programs. XIN77 handles all F77 variable types except double precision and complex.

Among the special facilities offered by XIN77 are:

- Automatic prompting for input
- Simplified command string recognition
- Use of either of 2 user-specified delimiters
- The ability to 'force' a new line to be read

- Automatic conversion of lower case characters to upper case
- Elimination of leading and trailing blanks and all control characters

The source code is permitted to the PX53 catalog under the name .XIN77. Also, documentation is available in the DY28 catalog in EDIT RUNOFF format under the name .XINDOC.

This subroutine takes about 630 words in object form and is reasonably fast in execution. The program was converted from FIV a year ago and has been used in several systems with great success.

## AVOIDING MULTIPLE HSS SESSIONS USING DSXMIT-DOS

Customers who utilize DSXMIT-DOS are forever complaining about how to avoid Multiple HSS Session using the \*Receive Command followed by Systems Commands.

By Multiple HSS Sessions; we simply mean one in which the operator has to dial twice for using one DSXMIT job step to initiate two HSS Sessions. It should be noted that the current DSXMIT Software does not support the \*EOM (End of Multiple Session).

To avoid Multiple HSS Session using the \*Receive Command followed by System Commands or vice versa, the user should temporarily assign the Card Punch or Printer and/or Printer to Tape or Disk (if Tape or Disk is involved). It should be noted that information going to Tape will result in an un-Labeled Tape. It should also be noted that if the Printer is assigned to a device, all Printed output will go to that device.

An example of an assign Card for sending Punch Information to Tape or Disk may look like the following:

Example

```
ASSGN  SYSPCH, X '180'  (For Tape)
ASSGN  SYSPCH, X '235'  (For Disk)
```

If one wants to reassign the Printer use the ASSGN:

Example

```
ASSGN  SYSLST, X '180'  (For Tape)
ASSGN  SYSLST, X '235'  (For Disk)
```

*Continued on next Page*

Continued from previous Page

Consider the following two examples that generate two HSS Sessions:

Examples:

1. XXX99999,PWD (user # card)  
  
\*LTID LION, CPUNCH  
  
\*MODE INPUT (OUTPUT (TTFILE),  
LIST), WAIT  
  
\*RECEIVE AFILE (ASCII); DDN=DD1,  
SYS008, F(80); FORM=PUNCH  
  
RUN TFILE  
  
PRINT KFILE (ASCII); LION; NONE  
  
\*EOS
2. Simply put the Run and Print Command in Example 1 after the \*MODE CARD.

In Example 1, two HSS Sessions will be generated by DSXMIT-DOS. The first session will only reflect the \*Receive and the second session will reflect the Run and Print Command.

In Example 2, two HSS Sessions will be generated also. The first session will only reflect the Run and Print Command and the second session will reflect the \*Received.

As stated earlier, to avoid this difficulty, the user should temporarily

assign the Card Punch or Printer to Disk or Tape (if Tape or Disk are involved), and use the Punch or Print Command.

The following example reflects such a case:

Example:

```
XXX99999,PWD  
  
*MODE INPUT (OUTPUT (TTFILE),  
LIST), WAIT  
  
PUNCH AFILE (ASCII); LION; NONE  
  
RUN TFILE  
  
PRINT KFILE (ASCII); LION; NONE  
  
*EOS
```

This will not generate multiple HSS Sessions.

Things to Consider:

1. If a file is queued for Punch and the file is Random or Pure and the Record length of the Mark III File is greater than 80 characters, the user will only receive 80 Character Records to the temporarily assigned file.
2. If a file is queued for Print and the file is Random or Pure and the Record length is greater than 132, the user will only receive 132 Character Records to the temporarily assigned file.

# INTERFACE

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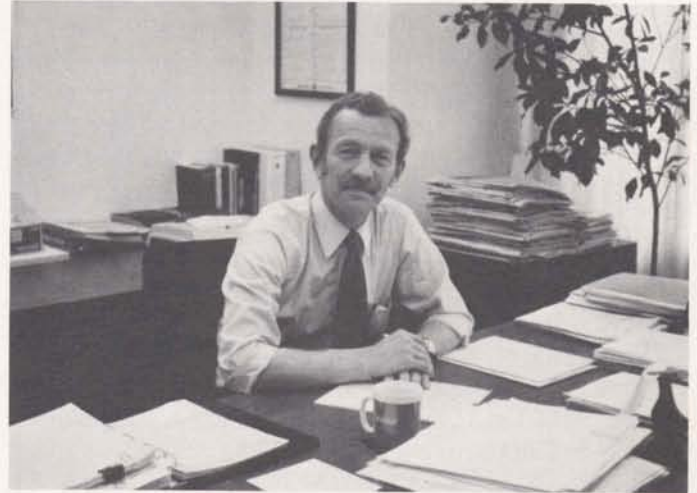


## SYSTEM RESPONSE OR Is There Life After Swap?

### DIFFERENT STROKES FOR DIFFERENT FOLKS

Does "Time-Sharing" mean "Fair-Sharing"? Certainly not! Any one who has written application programs knows that MARK III<sup>®</sup> Service, as well as other time-sharing operating systems, treats different programs quite differently. Moreover, we know instinctively that the extremes in system treatment are in some way related to the extremes in program characteristics.

*"RESPONSE" Continued on Page 5*



*Gerald A. Gay, author of "System Response or Is There Life After Swap?", is Manager of Systems Engineering.*

## CA EMPLOYEES SHARE IN \$37,200 STRETCHBUCK BONANZA

Based on GEISCO's good first quarter sales results, 122 CA employees shared in a Stretchbuck distribution worth \$37,200 today and possibly as much as \$65,100 when redeemed early next year.

There were 152 individual awards.... two for \$600 each, 30 for \$400, and 120 for \$200.

One of the \$600 awards was to Bill Cafiero for his outstanding, and widely recognized, contributions to the MARKLINK (SM) Service program...teaching courses, participating in the design and development of the new Order Service package, and preparing several major proposals to key prospects for this new service offering.

The other \$600 award went to John Chadderdon who has been instrumental in the successful selling of two very large manufacturing systems currently being implemented at G. E. Carboloy in Detroit. John was also commended for his excellent consulting support to the field, particularly in the manufacturing area.

There were three sales regions which achieved a 30%V (the percent increase over the same period in the prior year), and, as a result, each employee in the corresponding CA Region - Eastern, Northern, and Southern - earned a \$200 sales performance award. Also

*"STRETCHBUCK" Continued on Page 4*

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## PEM COURSE HELD AT ITC

CA Managers have been attending a new course, Professional Employee Management (PEM), developed by Corporate Employee Relations. The course emphasizes improved people management and much of the time is spent participating in individual or small group involvement using recommended concepts.

Ed Isaacs, Bill Marcy and Ron Smith, attended six consecutive Thursday afternoon sessions beginning January 11 and ending February 15.

A consolidated course from April 23 through April 25 was attended by the following CA field managers: Bob Aitchison, David Aaronson, Roger Black, Don Bishop, Jim Cahill, Marilyn Friend, Art Lee, Eileen Ripley, Lisa Rosenblatt, Gene Vennesland, Dave Votta and Roger Wilberg.

## AND OUT OF THE PAST

### FIVE YEARS AGO...

- MARK III <sup>®</sup> Service became available in Norway and Finland.
- A National Training Council of senior ISBD employees was formed to maximize Division training activities.
- The Rocky Mountain Branch won Campaign Alpha, a special sales contest for new contracts, and every branch employee received a 7 day trip, for two, to Spain and Portugal.

### TEN YEARS AGO...

- ISBD held its first Quarter Century luncheon.
- GE Time-Sharing Service was introduced in Europe.
- General Electric Company maintained its place as second largest industrial user of computers.

## CA STANDARDS PROJECT UNDERWAY

What does a McDonald's BIG MAC hamburger have in common with CA? If you said nothing, you're right (for now anyway). This is mentioned because the BIG MAC hamburger is a good example of standards in practice. When you buy a BIG MAC in Rockville you can be assured that it's going to be of the same quality as a BIG MAC bought in Chicago, Atlanta, or San Francisco.

Obviously, CA is not in the business of selling hamburgers, but we are in the business of selling applications software and much like the BIG MAC hamburger, we need to assure our customers that they will indeed receive high quality service, completed in a reasonable amount of time.

# THE ROUNDTABLE

By now I am sure at least the people in CA are aware that we announced a new organization on April 20 and hopefully most of you have been given some explanation of why we made the change. However, considering the diverse readership of INTERFACE, I thought it would be appropriate to briefly comment on the two major reasons for this reorganization.

The first is to strengthen our support of the long term strategy of GEISCO to build functional and industry expertise for the marketing of value-added products and services. The combining of the existing functional groups into a new Industry Applications and Support organization will fulfill this goal by providing the regional CA and field Sales organizations with functional expertise and support for new application software products. At the same time this organization will provide the resources and control necessary to address multi-functional opportunities.

The second major reason, is to streamline the organization and position it

for continued growth. This was most visibly accomplished by combining the functional groups which eliminated existing overlaps and inconsistencies. A less visible but equally important change took place in the CA regions with the definition and expansion of the Application Development Offices and Dedicated Support Offices. The CA regions will now have the organizational flexibility to support the needs of new business thrusts such as Fixed Capacity Service.

Of course a new structure doesn't make an organization work, people do. But hopefully this structure will allow CA people to function more effectively.

There are several other aspects to this realignment and more detailed information is available, if you are interested, in a Crossfile sent to all CA and Region Sales Managers on April 25. I would also be happy to answer any questions of general interest in future issues of INTERFACE.

Ned Heinbach

The software should be reliable and maintainable regardless of whether the system is developed in Boston, Dallas, or San Francisco.

A CA Standards Project team has been formed to achieve this end. The team, Ron Smith (Rockville), Michael Levine (Rockville), and Harry Singh (Dallas) has been chartered to gather ideas from the field, survey the various Modern Programming Practices (see article this issue), and examine available techniques training.

The ultimate goal of this effort is to provide CA people with useful techniques and training that will assist them in developing reliable and maintainable customer software.



*CA Standards Project Team from left to right: Harry Singh, Michael Levine and Ron Smith*

*"STRETCHBUCK" Continued from Page 1*

earning sales performance awards for 30%V achievement in corresponding sales organizations were the people in CA's Order Service and Federal Regions and in the Los Angeles Office.



*Ned Heinbach (center) presents special Stretchbuck awards to John Chadderdon (left) and Bill Cafiero (right).*

Individuals nominated and selected by their Region/Office managers for special awards for exceptional performance during the first quarter were as follows:

\$400 - M. Beasley, J. Boelke, S. Carlson, J. Chadderdon, T. Choate, R. Choppy, D. Dong, I. Ellman, S. Eng, L. Greenberg, R. Grissom, H. Hamer, C. Hamilton, G. Horodeck, P. Kaur, E. Kilpatrick, L. Kwan, A. Lapin, B. Lennon, E. McGarrity, T. McKone, D. Mitchell, S. Parekh, C. Peterson, S. Sather, C. Shofner, A. To, J. Travis, M. Waldron, T. Walters

\$200 - G. Carp, D. Darnell, S. Eng, R. Evanoff, P. Galidas, C. Gomez, J. Jackson, S. Kasturi, S. Klaber, J. Lapointe, M. Moore, W. Neudorff, S. Parekh, C. Pitt, R. Rowe, S. Sinkovich, P. Snyder, F. Stever, B. Sullivan, R. Watkins, K. Yajko

Stretchbuck certificates are being awarded and distributed at the end of each quarter, but they are not redeemable until next February 15 (or thereabouts) when 1979 sales results have been finalized. Any award recipients leaving GEISCO before then will not receive awards.

The leverage factor, which plays an important role in establishing the final value of each Stretchbuck, is based on the final national percent V for 1979 and is shown in the following table:

<u>CONVERSION TABLE</u>	
<u>REVENUE PERFORMANCE</u>	<u>STRETCHBUCK VALUE</u>
< 30%V	1.00
≥ 30%V but < 31%V	1.25
≥ 31%V but ≤ 32%V	1.50
> 32%V	1.75

Thus, if we can do our part in getting this V percent up to 32%, each Stretchbuck will be worth \$1.75, rather than the \$1.00 par value. Percent V through the first quarter was just barely below 30%, so, at present, the \$1.00 par value prevails.

Congratulations are extended to all our first quarter winners. Those of you not yet in the winner's list, there's still plenty of time and opportunity.

If you're not familiar with all the rules and qualifications, check with your manager.

## IN THE BEGINNING . . .

When timesharing was conceived, the most important characteristic of a program was considered to be its demand for instruction execution. Consequently, we devised a system which, more-or-less, gave competing programs equal "slices" of the CPU, with the obvious outcome that programs with a large demand for instruction execution took longer to run than programs with a smaller demand. But that seemed reasonable. It should take longer to do more work, should it not?

## A NEW DIMENSION

As data base I/O gained more importance as a major program characteristic, we reapplied the "equal slice" principle and gave each competing program its "fair share" of the system's I/O capacity. As before, programs with a high demand (in this case, more I/O's) took longer to execute, naturally, than programs with a lower demand but, again, this was regarded as fair in the light of the larger amount of work involved.

## CAN "BIG" BE BEAUTIFUL?

The demand characteristic which really wrecked havoc on system predictability, though, was program size. We all know that, in order to execute, a program must reside in system memory. But what do we do with a program that is large, relative to this system memory? If we allow this program to enter memory, there is not enough remaining memory space for the multiprogramming depth we require to achieve maximum system utilization. Additionally, the swapping activity for this program is a burdensome demand on system capacity.

## THE DEADLY COMPROMISE

I think it's quite clear that in non-virtual systems it is nearly impossible

to give the large program its "fair share" of the CPU. After imposing a high demand on the system during swap, the program finds itself in memory with very little competition from other programs. In this setting, it is free to gobble up a very "unfair" share of I/O's and CPU cycles. We "solved" this problem in MARK III Service in a fashion very similar to the way it has been "solved" in other operating systems. We simply allow (or even help, by assigning a longer memory residency) the large program to get its "unfair" share while it is in memory, but make it more difficult for the program to re-enter memory once it has been swapped out. With this approach, the larger programs get bigger, but less frequent, shots at the CPU while, on the average, getting access to roughly equivalent resources.

## THE MYSTERIOUS FOURTH DIMENSION

The need for high responsiveness, or "response" is really a curious program demand characteristic. In many instances, a transaction orientated program requiring high response does not impose a dramatic demand on the traditional resources (CPU cycles and I/O), but it does demand that the limited resources required for a transaction be delivered quickly.

Clearly, this is a radically different type of demand from others we have discussed and, as we have learned, MARK III Service, optimized for the first three dimensions, is not well designed to provide high transaction response. The problem is particularly acute when high response is demanded by a large program since, as discussed earlier, our design concept ("The Deadly Compromise") for large programs runs counter to the high interactive response requirement.

## WHERE WE'RE AT

We now have two extreme ways of providing transaction processing: the "old

way" of running multiple-copies-per-stream with timesharing methodology and the "new way" of running multi-stream TP into an application locked in memory.

The trick under the "old way", of course, is to keep the program small, and to limit the CPU and I/O demand to assure the transaction can be satisfied in one memory residency. (If one swap is bad, two can be a disaster.) There's no trick at all under the "new way", other than to make a wise choice among the larger candidate applications when selecting those which are to be locked in memory.

But, if not all transaction applications can be locked in core, what do we do about the single and multiple stream applications which have to swap, especially considering the fact that, in spite of our best efforts, these programs are getting larger and larger in size and more and more critical to our customers?

#### WHERE WE'RE GOING

I admit we're a bit behind the eight-ball in providing large program response, but let me describe five areas of activity which should result in relief for the application programmer on the TP firing line.

#### Step 1

Nothing solves memory shortages better than adding memory! Unfortunately, we have not been able to meet the memory demands with our old H6088 foreground machines. In May though, we began deploying the latest Honeywell mainframes (L66/DPS) which should permit us to make a substantial expansion in system memory.

#### Step 2

Increased memory is of no value if it isn't used properly. Our present swapping algorithms are designed for the old memory-limited machines. A new algorithm has been developed for

ISR910 and is now being tested. This release will permit us to exploit the memory expansion capability of the L66/DPS systems to the fullest. The ultimate benefit of ISR910 and L66/DPS deployment should be felt by the end of 1979.

#### Step 3

If swap must occur it helps to do it quickly. Over the course of this year we will deploy a new, and extremely fast, swap device to our foreground systems. Rather than being based on rotating storage (disk/drum) as most swapping mechanisms are, this device actually uses bulk semiconductor memory to achieve very low access times and high transfer speeds.

#### Step 4

To this point we have discussed the application of but a single system swap algorithm, an approach which cannot achieve total optimization in an environment of mixed timesharing and transaction processing demand. We believe that substantial improvements can be made by creating classes of demand (T/S, TP, batch) and applying unique algorithms (or the equivalent) to each. A great deal of thought has already been given to this approach and some features in ISR910, in fact, provide a stepping-stone to a future class (or priority) based system. Although schedules are not firm at this time, I have high hope that such a system design will have been deployed by the 1st or 2nd quarter of 1980.

#### Step 5

Memory will always be limited to some extent, so system bias against large programs will probably always be felt by the applications programmer. Never-the-less, it is possible with virtual memory systems to make major improvements in large program response. Virtual memory is a reality (forgive me) with the L66/DPS

hardware, since NSA (Honeywell's term for virtual memory) equipment is available. The MARK III Service software design effort to support the hardware is now beginning with the objective of releasing, at least, a part of the virtual memory capability in 1980.

#### MEANWHILE

Although we're making an all-out effort to improve response through system changes, applications program designers must always consider system characteristics which effect response. There are two broad areas to watch out for; program size and transaction resource demand.

More-than-likely, we will always tend to optimize our system according to average program size (or according to average size within a class if priority-class scheduling is used). Consequently, an excellent rule-of-thumb for the applications programmer is to avoid, if possible, the use of programs which significantly exceed average size values when response is of great concern. In today's terms (average size now is about 20K words) this means that programs in the 20K-25K range offer good response while those in the 35K-40K range are far less satisfactory. As average program size grows the system changes discussed earlier will provide the fast response they will require. However, programs of unusual size relative to this future average will, no doubt, still suffer by comparison.

There are two ways of looking at transaction resource demand. The first relates to the I/O's and CPU cycles required by a single transaction. A simple way of understanding this is to consider the profile of an "average" program while it is active in system memory. Every second this program gets from .5 to .9 CRU's and from 5 to 9 permanent file accesses. Since you can afford no more than one or two seconds execution in a high response environment this suggests that transactions should be limited to about 1 CRU and 10 file accesses, wherever possible.

The second aspect of system demand relates to system imposed (and, perhaps, unexpected) swaps. Some of the more important of these which are controllable by program design are:

- 1) TTY Input and Output
- 2) Call Command
- 3) Set Function ( Break)
- 4) Call Sleep
- 5) Call Wake

In addition to these activities it should be noted that actions which increase program size in memory may cause a swap also, depending on the availability of contiguous memory space. Examples are:

- 1) Overlays
- 2) String, array and link expansion
- 3) Initial file Read/Write

If the applications programmers is careful to observe these simple rules of thumb he will observe approximately the following average transaction delays on properly loaded foreground systems:

Network-Round Trip	1-2 sec.
Swap-In	2-3 sec.
Execution	1-2 sec.
Total	4-7 sec.

If core lock-in is being used (even for very large programs) the swap-in delay is replaced by an FCM service time of 1-2 seconds. It should also be realized that the delays shown are those expected under average conditions. Because of system dynamics, response can vary greatly from transaction to transaction. As a rough guide to this variation I can suggest that at the 95th percentile the delay is about three times greater than the values shown and is due mainly, to increased swap time.

#### THE TWO-WAY STREET

In the back rooms of Engineering, we have a tendency to tune the system on the basis of past and present measurements of the statistics of user program demand. In the applications world,

## GARGALLO AND GAILEY RECEIVE MANAGEMENT AWARDS

Frank Gargallo and Carolyn Gailey have received Management Awards for the extra effort and excellence they have demonstrated in accomplishing complex Custom Applications projects and most recently the General Telephone of Florida MARK System (Mechanized Assignment and Record Keeping).

These accomplishments reflect the high level of dedication, professionalism and energy that both Frank and Carolyn have applied to this major Company opportunity.



Frank has been with the Company since the 'Summer of 72' and has spent the last 5 years on GTF/MARK. Initially, he was the entire implementation team, but as the system approach gained acceptance by GTF, more funds were available for system development. Today, Frank is Project Manager of the seven person team responsible for the on-going development and support of the system. Frank's knowledge of the application was voiced by Ray Bryant, Information Systems Director for GTF, who said, "Frank now knows more about my business than I do."



Carolyn Gailey has spent the last two years on the GTF/MARK System. Initially, she handled the Maintenance Agreement but recently has been responsible for the day-to-day customer support. This support requirement has grown significantly over the past year as GTF completes the automation of all telephones. Upon completion of this phase, the service records of over one million telephones will be maintained within the GTF/MARK System.

Both Frank and Carolyn are in ADO/Atlanta.



*John Travis, CA/Atlanta ADO Manager, presents awards to Carolyn Gailey and Frank Gargallo for outstanding contributions.*



# PEOPLE



Bill was originally introduced to computers by the U.S. Army in 1955. Upon his discharge in 1956, he worked the night shift in the Insulating Department of Travelers Insurance Company while attending Trinity College. He received his B.A. in Economics in 1958 and his MBA from Wharton, University of Pennsylvania in 1970.

His first full time job was with the Boeing Company's Business Data Processing organization in Seattle. UNIVAC I.T.&T., The Chessie Systems and Cleveland State University are also previous employers. Prior to joining GE, Bill was self-employed as a consultant.

Bill joined CA in 1977 as a Consulting Specialist/VS, and took over the management of the MARK 3000 Technical Services group in January of this year. Among

the other tasks involving his organization are the conversion of 7 systems now running on the VS Background Service.

Besides directing CA's MARK 3000 Service activities, Bill has been active in assisting in the development of the MARK 3000 Service offering.

Bill Marcy has been working with IBM equipment since 1955. He joined General Electric in 1973 and was one of the first GEISCO employees to work exclusively on the IBM services (Facility Management, CRIPS/370, VS Background, and now MARK 3000 (SM) Service). Because of the various ups and downs of IBM efforts, Bill has worked, at one time or another, in every department except Employee Relations, Finance and Legal.

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## TRAINING PROGRAM FOR CA PROJECT MANAGERS AND OFFICE MANAGERS

GE Corporate Consulting Services staff members, Jim Bright, Dean Daniels, Steve Mercer, and Joanne Volakakis, are preparing a critical skills training program for CA Project Managers and Office Managers. This program is a result of recommendations by a CA Training and Standards Task Force headed by Norm McBurney.

Before determining the most applicable and effective course content, the Corporate Consulting staff developed job models. The approach used to obtain and

analyze information included working with CA personnel to compile Work Activity Activity Dictionaries, questionnaires for all Project Managers and Office Managers, and workshops.

The Project Manager Job Model Workshop was held February 12-14 at the Stouffer's National Center Hotel in Washington, D.C. CA representatives participating were Dan Darnell from Rockville, Daisy Dong from Boston, Ira Ellman from New York,

*"TRAINING" Continued on Next Page*

*"TRAINING" Continued from Previous Page*

Marilyn Friend from Dallas, Rudy Gawron from Philadelphia, Ray Grzybowski from Chicago, Rick Sumner from Oakland, John Travis from Atlanta, and Gene Vennesland from Schenectady.

The Office Manager Job Model Workshop held April 26-27, at GE offices in New York City, was attended by Roger Black from Atlanta, Barbara Harbison from Oakland, Ed Isaacs from Washington D.C., Eileen Ripley from New York, Lisa Rosenblatt from Cleveland, and Ed Scott from Philadelphia.

Workshop effort concentrated on identifying and defining activities, allocating the amount of time to be spent on each, determining the skills necessary for each and formulating appropriate measurement criteria. Participants also identified the key skills required by CA managers, and those which they felt needed additional development.

After the "ideal" job models were developed, tested, refined and reviewed, the Corporate Consulting staff finalized the skills requirement lists, reviewed available training programs and proposed the final course outline.

Actual training to prepare prospective Project Managers and to improve the effectiveness of current Project Managers and Office Managers is planned to begin early this fall.

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*"RESPONSE" Continued from Page 7*

though, the programmer is dealing with present and future customer requirements. I've attempted, here, to explain what we are doing with the critical "nuts and bolts" of the system but to avoid the development of a serious gap between what-we-need and what-we-offer we must open the lines of communication between the applications programmer and the system architect and improve our ability to convert up-to-the-minute user requirements to system design.

## WHAT'S HAPPENING

In CA...

- Industry Applications and Support subsection reporting to Will Gilly formed by combining Order Service, Financial Services, Manufacturing Services, MARK 3000 Service and CA/Federal.
- CA Financial Administration subsection reporting to Larry Snively established with responsibility for all day-to-day operational and administrative activities.
- John Chadderdon becomes manager of new Manufacturing Services unit.
- John Travis becomes manager of Atlanta ADO.
- Ira Ellman becomes manager of CA/New York.
- Welcome to the following new employees to join CA since April 1, 1979:

Eastern

Brooke Savage

Industry Application & Support

Cotrilla Ewing

Mike Levine

John Sandstrom

Central

Stanley Brown

Frances Jackson

James Jenkins

Katherine Kimbrough

Robert Nolan

Michael Williamson

Northern

Joseph Berdini

Fred Engelmann

David Woolley

Southern

Gary Kromer

Myra Pierce

Ellen Sutliff

James Wright

## FATAL ERROR TRAPPING

In writing programs, trapping and acknowledging fatal errors is usually the most boring and tedious coding to be done. Fatal error, for the purpose of this article, is defined by an error which the program does not normally anticipate, and which usually, would cause the program to terminate immediately. These errors range from division by zero, to taking the second alternate return in HISAM call, to illegal address encountered, and usually have a unique F77 IERROR status code associated with them. Errors such as data parsing, controlled file contention, and others which are a designed part of the program logic are not considered fatal.

Normally, when a fatal error is encountered, two things may happen; the program "bombs" and stops because no error recovery provision was provided, or the program jumps to some sort of message which is displayed and stops. Both of these techniques may be improved to provide better and more accurate error trapping, and also to reduce the amount of coding necessary by the programmer.

In most production systems, the users are normally controlled very tightly in the functions they may perform. Also, they tend to be non-DP personnel who do not understand programmer vocabulary, and are not familiar with the MARK III Foreground System. Because of this, it is normally undesirable to allow the user to get to the MARK III System level. The incidence of a program "bombing" or prematurely aborting may be reduced by utilizing all existing error transfers provided by F77. This includes alternate returns in subroutine calls, and \$ERR transfers in executable statements. Additionally, routines and errors which do not provide a specific error transfer route may be protected by utilizing the fault processing routines. As a matter of good error recovery, all fault processing routine should be

utilized, including CRURUN to catch any infinite loops.

As noted before, most users are not familiar with computers, so it is usually of no value to display some type of cryptic message explaining the fault. Normally, the users will ignore the message, either because they do not understand it, they do not have time to report it, or they think it was an isolated problem. A better method to use is to issue a standard message for all fatal errors encountered, record the incident in a file, and log the user off. The message should be as simple as possible, such as FATAL ERROR ENCOUNTERED, CALL SYSTEM ADMINISTRATOR.

Generally, the type of information to be saved varies with the application, but at minimum should be the date, time, user number, project ID, program or module name, the line number where the error was encountered, and the F77 IERROR code. The date, time, user number, project ID, and IERROR code may all be obtained through F77 intrinsic functions. The program or module name may be an alpha variable whose value is set and reset according to needs. The line number cannot be determined through any intrinsic function, so a variable must be used, which is set equal to the line number of the next executable statement. This variable should not be used for every executable statement, especially in loops executed many times, but for those which have alternate returns or \$ERR transfers, and for general groups of code. The variable may be set equal to the line number by initially setting the values to zero, in all places then using the change command with mask as follows:

```
CHAM$ 1000/FROM = 0 (CR)
MORE> $$$$ /FROM = $$$$ (CR)
MORE> $$$$ /9999
```

This technique must be done carefully, and once for each change in line number length.

*"ERROR" Continued on Page 15*

# TECHNICAL MAILBOX

## INTRODUCTION

It is imperative that the applications developed by CA are RELIABLE and EASY to MODIFY & MAINTAIN. The historical research as well as the practical approach used in much of the Data Processing industry has proven that Modern Programming Practices (MPP) such as structured design, walkthroughs, and structured programming can facilitate many of these problems.

Most computer programs are never designed --- they are created on the coding pad! This generates programs that are poorly constructed, resulting in unreliability, higher modification costs, and higher maintenance time spans.

Historically, the computer scientists have tried to prepare a myriad of theoretical approaches to structured programming (e.g., GO-TO-LESS, IF-THEN-ELSE, TOP-DOWN, IPO CHARTS, etc.). These techniques, if properly used, have definitely improved the readability of the code. But, is the code really reliable?

Reliability and functional correctness of a program do not entirely depend upon a well documented (GO-TO-LESS, TOP-DOWN) code. The code must also be correct, which can only be ensured through proper planning and control (design and walkthroughs).

This article (first in a series) is intended to introduce the methodology for Structured Design & Programming

that may be tailored to CA. A successful attempt has been made to develop the GESCO MARKLINK Service Project using this approach.

## CURRENT APPROACH

Before we can set rules to solve some of the ills in our current procedure, we must understand their root causes.

CA serves a unique marketplace. There are the frequently unrealistic demands from customers for low costs and hurry-up schedules. Responding to these pressures with quick solutions preempts thorough planning and good design.

For many years, a programmer would learn the instruction set for a given computer or a programming language. That was considered the only qualification to WRITE (design, code, test, and implement) an Application Program. Using flowcharts as the primary tool, the programmer charged forward to solve the problem employing his/her own set of rules in the construction of the logic of the program. The programs were built on a trial-and-error basis, coping with each new combination of conditions as they were encountered. Little emphasis was placed upon how to design a GOOD program, that is, a program that was both correct and easy to maintain. Functional inconsistencies were only discovered at the time of implementation, because it lacked reviews DURING the development process.



Computer programming is a practical human activity. Programming is used as an art rather than a science. For lack of any structured process, the logic for similar problems coded by different programmers is rarely identical. Modifications and maintenance become a nightmare.

The largest and most severe problem of all is lack of planning. Projects rarely fail due to technical reasons. Most project failures and difficulties are related to:

Planning (Design)

Tracking (Feedback, Walkthroughs, Measurements, and Audits)

Controlling (especially change)

STRUCTURED DEVELOPMENT PROCESS

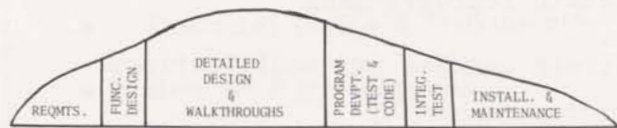
The traditional and IBM approach (Managing The Application Development Process - Part I, course developed by IBM) stresses that a major part of the project effort be allocated to Program Development (mainly coding & testing):

IBM APPROACH



Rather, emphasis should be placed upon Design & Walkthroughs (Reviews):

SUGGESTED APPROACH



The suggested concept of structured design is based upon:

Top Down Development

Functional Decomposition

Design & Design Walkthroughs

Coding & Coding Walkthroughs

Testing to Check for Correctness

Efficiency Considerations & Walkthroughs

These tried and proven techniques (GESCO Project) can be implemented by:

Emphasis on Design

Emphasis on Walkthroughs for Design, Coding and Techniques

Project Manager's role to assure that the design is correct rather than fighting fires to complete the project.

Uniform rules to control and report the entire project (naming conventions, design formats, software management, etc.)

"MPP" Continued on Next Page

BENEFITS

- Increase productivity
- Improve project control
- Improve quality and reliability of programs
- Reduce testing time
- Reduce maintenance costs
- Facilitate reprogramming
- Facilitate changes and modifications
- Facilitate personnel reassignments
- Improve communications among customers, project teams, and management

CA's EXPERIENCE

The Dallas CA ADO has adopted several of the Modern Programming Practices described in this article and are currently using these techniques to develop a MARK III DDP order entry system for the General Electric Supply Company (GESCO).

. . .

More to come on structured design and walkthroughs.

*Harry Singh, author of this article, has been a member of the GESCO Project team in Dallas. He is currently on a special assignment to formulate standard development techniques for CA using Modern Programming Practices. If you have any questions, call Harry on 8\*352-6681.*



BUZZ WORDS

- CMF - ComMands from File is a method of executing system commands from a file.
- CUP - Custom Usage Plan is a special subscription pricing arrangement for MARK III Service.
- DDP - Distributed Data Processing is work being done by decentralized computers connected by a network and controlled by a central "host" computer.
- HSC - High Speed Concentrator is a remote device allowing interface between high-speed terminals and the MARK III Service network.
- IPO Chart - Input/Processing/Output Chart is the overview of the system being designed. It is not a flow chart in the conventional sense.  
  
IPO charts stress only WHAT NEEDS TO BE DONE (not how and when).  
  
IPO charts are concerned with the:  
  
Output that is to be produced, the Input required, and the major Processing tasks that are necessary to convert the input to the output.  
  
IPO charts are utilized in the TOP-DOWN STRUCTURED DESIGN.
- RC - Remote Concentrator is a computer used to transmit low-speed terminal I/O.
- VSPC - Virtual Storage Personal Computing is a time-sharing system for interactive computing environment.

By recording the necessary information concerning a fatal error, the actual problem may be pinpointed very quickly. The fact that all fatal errors are recorded allows the system administrator to know first hand of its occurrence, whether it is prevalent for all users or just localized, and reduces the dependence on the user to report all occurrences. By utilizing a subroutine for the fatal error trapping procedure, all alternate returns and \$ERR transfer should point to the same statement, the one which calls the fatal error subroutine. A subroutine, .FATAL, is available on the DY28 catalog. This routine will take care of TIP as well as teletype situations, and may be modified to meet the needs of the system in question.

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## WHAT'S COMING

- FAS
- DMSIII
- We Speak "FAS" Here
- Training by Ethnotech
- Engineering File Systems
- Structured Design & Walkthroughs
- More on File Contention
- First person description of Technical Symposium at Pine Isle, Georgia

## NCUTIL2\*\*\* CHECKS DATA INTEGRITY

The Program NCUTIL2\*\*\* (Numerical Control Utility Program) can be used to find non-printing characters, and is less expensive than NONPRINT\*\*\*. The following represents the options available:

The current file is the file to be searched.

/NCUTIL2\*\*\* Find control characters including lower case.

/NCUTIL2\*\*\* L Do not flag lower case.

/NCUTIL2\*\*\* D Find control characters and delete them from current file.

/NCUTIL2\*\*\* DL Find and delete, but accept lower case.

/NCUTIL2\*\*\* V Find, delete, and verify while deleting, print 'CHAVC' commands used.

/NCUTIL2\*\*\* VL Same as V but accept lower case.

NOTE: The characters are deleted from the current file but not replaced in permanent storage. The position of the characters is identified by a line feed.



# ENGINEERING DEPARTMENT MEETING

Rockville Civic Center  
May 16, 1979



CLAIR ANKOVER

# INTERFACE

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